



**ARNOLD TROPHY**—Apollo VIII crewmen Frank Borman, James Lovell and William Anders accept the Air Force Association Gen. Henry H. Arnold Trophy "for outstanding contribution of the year by a man or men to aerospace activity." The award was made March 21 during the AFA convention in Houston in recognition of the first manned lunar orbit spaceflight.

## Week-Long Sim Tests LRL Quarantine Area

Fifteen NASA and contractor employees spent last week in isolation as part of a premission simulation of the Lunar Receiving Laboratory.

Purpose of the seven-day test was to demonstrate the logistics and quarantine aspects of the Crew Reception Area (CRA). People taking part in the simulation worked, ate and slept inside the multi-room CRA. Their only contact with the outside world was by telephone or through glass walls.

Apollo crews returning from the moon later this year will spend more than two weeks in the CRA until the biological testing of lunar samples is completed. The crew will be released from quarantine when it is determined that the samples hold no harmful pathogens.

The simulation covered all aspects of the CRA quarantine, using in most cases the same people who will take part in the lunar landing mission with the exception of the flight crew. Three stand-ins played the part of the flight crew.

CRA medical test director Dr. Clarence Jernigan said the simulation was aimed toward demonstrating CRA logistics and the feasibility and adequacy of the quarantine operations plan, the medical contingency plan and the CRA release plan.

## Nimbus Launch Set for Friday

Another advanced Nimbus meteorology-oceanography satellite Friday will be launched from the Western Test Range atop a Thorad Agena-D launch vehicle into a 690-mile circular polar orbit. Nimbus B2 is a replacement for Nimbus B which was destroyed last May when the launch trajectory deviated.

Scientists hope that experiments carried aboard will lead to reliable long-range weather forecasting. Nimbus will communicate with sensors carried aboard floating buoys, balloons and aircraft.

Jernigan said the simulation included all activities starting with arrival of the lunar sample rock boxes, film and biological specimens. All biological barriers were operative during the simulation and test people were confined to the CRA for the length of the test. Briefings and family visits were held in the crew briefing room behind the glass wall barrier.

With the exception of the flight crew, all test people and simulated sample rock boxes and onboard film went into the CRA early March 24. The stand-in flight crew, flight surgeon and recovery technician entered the quarters the following morning.

The first part of the week was a simulation of the first week of an actual post-lunar mission quarantine and the last few days were devoted to release of the occupants. All people in the CRA underwent daily physical examinations and suffered simulated illnesses during the week-long test.

# ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



VOL. 8, NO. 12

APRIL 4, 1969

## Hardware Pipeline Fills Up For Busy Apollo Schedule

Apollo X prelaunch preparations for a May 18 launch were underway this week at Kennedy Space Center, and the hardware pipeline for subsequent Apollo missions began to fill up.

Launch vehicle systems verification tests were conducted this week on the Apollo X stack at KSC Launch Complex 39-B and hand controllers Tuesday were installed in the spacecraft. The Apollo X Flight Readiness Test is scheduled for next week.

The Apollo XI launch vehicle is in checkout in the Vehicle Assembly Building, while the spacecraft for that mission—possibly the first lunar landing—is in the Manned Spacecraft Operations Building in final assembly and checkout prior to the move to the VAB to top off the stack.

Second stage engine leak and functional tests were made Tuesday and an overall launch vehicle propellant systems/electrical interface test was run Wednesday. Mobile launcher swing arm mechanical and overall tests were scheduled for late this week.

The Apollo XI command/service module water system was drained and dried prior to removal of the spacecraft from the altitude chamber, and at mid-week, the high-gain antenna was scheduled for installation. The Apollo XI lunar module was moved from the altitude chamber to the landing gear fixture for installation and checkout of landing gear.

Taking the place of the Apollo XI spacecraft in the altitude chamber shortly will be the Apollo XII command/service module which arrived at KSC

March 28. The lunar module for this mission is undergoing ascent stage leak checks, and will be placed in the altitude chamber after these checks are complete.

The Apollo XII launch vehicle third stage is in preliminary checkout in the VAB, with the second stage to arrive at KSC later this month and the first stage will arrive in May.

The Apollo XIII S-II second stage Tuesday is scheduled for a test firing at the Mississippi Test Facility. Farther back along the pipeline, the Apollo XIV second stage March 27 shipped out from Seal Beach, Calif. aboard the USS *Point Barrow* en route for MTF for captive test firing. The vessel is due to dock at MTF Wednesday. The Apollo XIV third stage S-IVB Monday was flown from Huntington Beach, Calif. to Sacramento for captive test firing.

In MSC training and tests,

three of five scheduled drop tests of lunar module 2 were complete this week at the Bldg 49 Vibration and Acoustic Test Facility. LM-2 is an all-up spacecraft and is undergoing the drop test series to verify systems performance after a lunar landing.

Apollo X flight controllers this week ran simulations of the lunar orbit mission jointly with the crewmen in Apollo simulators at KSC. Simulations in the Mission Control Center included a 10-hour lunar orbit insertion (LOI) run Tuesday, and a 12-hour descent orbit insertion-rendezvous run Wednesday.

Apollo X backup crewmen L. Gordon Cooper, Donn F. Eisele, and Edgar D. Mitchell today were scheduled for water egress training offshore of Galveston in the Gulf of Mexico using a command module boilerplate tended by the MV *Retriever*.

LM TO BUZZ MOON—

## Apollo X Rehearses For Lunar Landing

Apollo X, scheduled for launch May 18, will be a lunar orbit mission in which two crewmen will descend to within 50,000 feet of the Moon's surface.

The decision last week to fly the mission as previously planned followed a series of reviews of technical and operational data from the Apollo IX flight in earth orbit last month and an examination of options for the next mission.

The eight-day Apollo X flight is scheduled for launch from Kennedy Space Center, Florida,

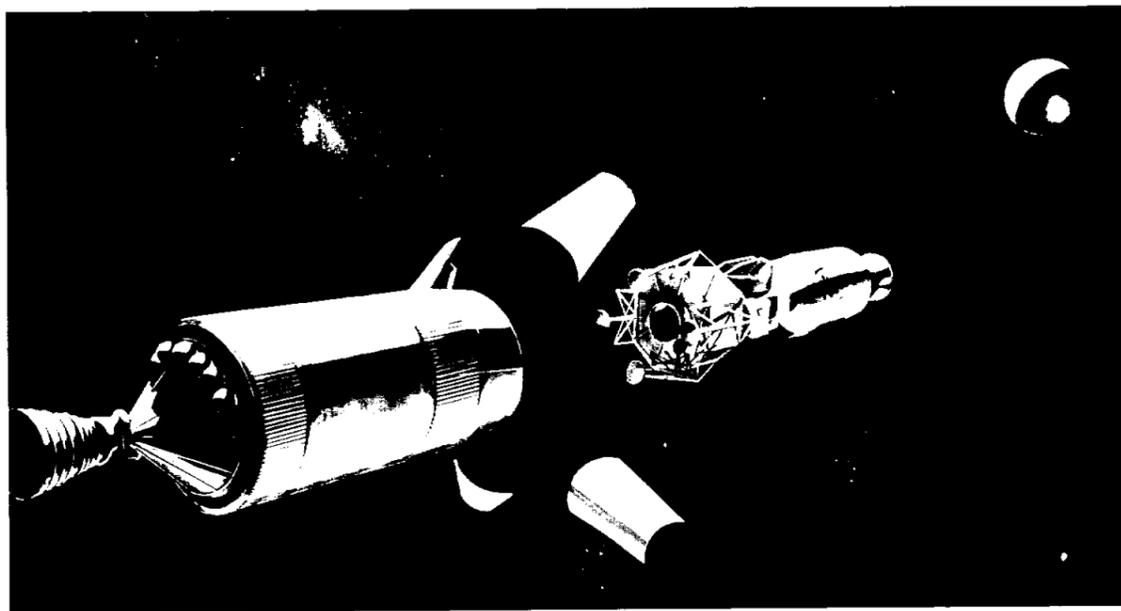
with Thomas P. Stafford as spacecraft commander, John W. Young as command module pilot, and Eugene Cernan as lunar module pilot. The backup crew is L. Gordon Cooper, Donn F. Eisele and Edgar D. Mitchell.

The purpose of the flight is to provide additional experience in combined system operation during the 3-day trip to the vicinity of the Moon and in lunar orbit. With the exception of the actual landing of the lunar module on the lunar surface, the mission plan is the same as for the lunar landing mission.

While the spacecraft circles the Moon at an altitude of about 60 miles, Stafford and Cernan in the lunar module will separate from the command and service modules, approach twice to within about 10 miles of one of the preselected Apollo landing sites, then rejoin Young in the command module in maneuvers similar to those performed in Earth orbit by Apollo IX.

The closest approach to the surface will be at pericyynthion of the lunar module transfer orbit. Because of propellant limitation in the ascent stage for this flight it will be impossible to make a landing and subsequent liftoff from the Moon.

During 11 more revolutions of the Moon, the crew will make landmark sightings, take photographs, and transmit live TV views of the lunar surface, the Earth from lunar distance, and their own activities inside the command module.



**BACKING OUT OF GARAGE**—Drawing shows a complete Apollo spacecraft pulling away from the S-IVB third stage after translunar injection in the Apollo X mission. After a good translunar injection is verified, the command/service module will turn around and dock with the lunar module and extract the LM from the spacecraft-LM adapter. After insertion into lunar orbit, Apollo X commander Tom Stafford and lunar module pilot Gene Cernan will man the LM and separate for a descent to within eight miles of the lunar surface while command module pilot John Young waits for their return in a rehearsal of a lunar orbit rendezvous following a manned lunar landing.

3 #700 + #597.50 9 Amsterdam - bus - Heidelberg  
- 30 people APRIL 4, 1969  
ROUNDUP  
Lynn  
Sandy

**SOMETHING BUGGING YOU?**



**PUT THE FINGER ON IT**

**COST REDUCTION PROGRAM**

**Stamp Club Issues Apollo VIII Stamp First Day Covers**

The MSC Stamp Club May 5 will issue souvenir envelopes to coincide with the public release of the Apollo VIII "earthrise" commemorative stamp. The envelopes are imprinted with the dates of the mission and the Apollo VIII four-color crew patch.

Each envelope will be affixed with the Apollo VIII stamp and cancelled in first-day ceremonies in Houston. Collectors wishing to buy these cacheted first-day covers should write to the MSC Stamp Club, Box 58238, Houston 77058.

Prices are \$.35 for each envelope or three for \$1. Each order should be accompanied by a self-addressed stamped letter-size envelope.

For additional information, call Stamp Club president Alan Doyle at 7278 or 591-2941 after hours.

**THE ASTRONUTS**

(filched from TRW Systems Group)



The *Roundup* is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

Director ..... Dr. Robert R. Gilruth  
Public Affairs Officer ..... Paul Haney  
Editor ..... Terry White  
Staff Photographer ..... A. "Pat" Patnesky

**Europe Tour Starts August 3**

A 22-day "Get acquainted with Europeans" tour has been organized for MSC and contractor employees leaving August 3 and returning August 24. Reservation deadline is May 30.

The \$655 price from New York, or \$790 from Houston, includes round-trip jet fare to Europe, bus, riverboat and steamship fares, lodging and breakfast.

A highlight of the tour will be a boat trip down the Rhine accompanied by a group from a German university. Nine countries, including mini-countries Monaco and Liechtenstein, are included in the tour, with stopovers at such cities as Amsterdam, Frankfurt, Lucerne, Innsbruck, Venice, Rome, Paris and London, and visits to the French and Italian Riviera.

Financing up to 14 months is available, and tour spaces are limited. Call Jim Hollis at 7701 or 946-6571 for further details.

**Umpires Sought**

Would-be softball umpires are urged to attend a meeting Wednesday in Room 261 Bldg 4 at 5:15 pm. Anyone who can holler "Yer Out!" and make it stick without backing down may be umpire material. Call EAA vice president-athletics Dennis Doherty at 3005 for further details.

**Incoming and Outgoing**



**WELL DONE** - EAA Vice-President-Athletics Dennis Doherty, left, presents a plaque "in appreciation for a job well done" to outgoing athletics veep Ray Southerns who held the post for two years.

**Space**

As man would venture from this earth and traverse 'cross vast space.  
He carries hopes of noble worth to free our human race.

Technology's the key to peace, a quiet power gained.  
The great unknown will never cease so must we search the brain.

Our life on earth is but a flash in universal time.  
To us, the challenge is a test, a mountain we must climb.

Although we have more leisure hours and money which to spend,  
The fields will soon be void of flowers, the grace of nature end.

Our lot on this good earth could fail and slowly slip our grasp  
Unless we stem this wanton trail of stains, pollutes, and waste.

For o'er this globe will people grow yea, even less will die.  
To feed them all with crops we sow, technology must try.

To live a peace that knows no length, stem avarice and greed,  
Advanced machines must give us strength, a posture all must heed.

Society apart from space thinks research something strange.  
So industry must form a base to meet this rapid change.

And as machines and men cast off for places like our moon,  
The message that great ship will waft is sunsets, blue lagoon,

Friendship to share, one peaceful race who breathes an air that's clean,  
When we build craft to venture space, it's good life here we glean.

John H. Boynton, Apollo Test Division  
March 25, 1969

**Your Job in Focus**

**Designation of Beneficiaries**

Employees should review periodically their position regarding Federal Employees Group Life Insurance, Retirement benefits, and Unpaid Compensation to assure that all designations of beneficiaries are satisfactory. There have been occasions when employees failed to change beneficiaries to suit altered circumstances. Also, designations of beneficiary for Federal Employees Group Life Insurance and Unpaid Compensation are automatically canceled when you change Agencies.

You do not have to name a beneficiary if you are satisfied to have these benefits paid in the order of precedence provided by law; that is (1) widow or widower; (2) child or children in equal shares; (3) parents in equal shares or the entire amount to the surviving parent; (4) duly appointed executor or administrator of your estate; (5) next of kin under the laws of your domi-

cile at the time of your death. If you want to name a beneficiary or change the designation, you may obtain the necessary forms from the Personnel Division, Administrative Section, extension 7381.

**Relatives Hired by NASA Contractors**

Relatives of MSC employees desirous of securing employment with a NASA contractor should make application directly and routinely to the company. There should be no intercession, directly or indirectly, by interested family members employed by NASA.

While there is no general prohibition against a relative of a NASA employee working for a NASA contractor, there is a legal prohibition against any NASA employee participating personally and substantially in any matter in which he, his spouse, or minor child has a financial interest.

**For Exceptional Service**



**FLIGHT DIRECTOR** - Vice President Spiro T. Agnew pins the NASA Exceptional Service Medal on Apollo IX prime flight director Eugene K. Kranz as NASA Administrator Dr. Thomas O. Paine reads the citation. The medal was presented March 26 at NASA Headquarters.

# Roundup Swap-Shop

(Deadline for Swap-Shop classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Ads are limited to MSC civil service employees and assigned military personnel. Maximum length is 20 words, including name, office code and home telephone number. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested.)

### FOR SALE/RENT—REAL ESTATE

Large heavily-wooded corner lot with view over Taylor Lake, half block to park and docks. 591-4632.

Tiki Island waterfront lot with boat slip. Ready to build on. Morris, 482-7775.

4-bdr on wooded lot Baywood, Seabrook, 2000 sq. ft., quiet street, pier privileges. \$26,000: equity, assume 6 1/4% loan or owner finance. Stamps, GR 4-2374.

Friendswood, low-equity rental property 4-2-2 brick ranch, central air, nice residential area. Realizing \$76/mo. profit. HU2-1326.

Waterfront lots on Galveston Bay and Lake Livingston, also wooded ranchettes. Mary Thompson, 932-5347 after 5.

3-bdr, 1-bath weekend/retirement home in Fulton, Texas two block Aransas Bay, large oaks, screened porch, \$10,500. Bill Campbell, 488-3635.

2-bdr cottage at Rockport, blk from Aransas Bay, jalousied bayside porch, furnished, financing or \$6000 cash. Bill Campbell, 488-3635.

3-1/2 1 brick home in Alvin, 15 miles from NASA, carpeted, paneled den, and 220v outlets. Lazarus Gonzales, 946-8185.

Rent 3-bdr brick in Garden Villa addition, air, heat, trees, fenced. \$95/mo. 941-0575.

Rent 3-bdr, 2 bath in Friendswood, available approximately April 10. T. J. Nelson, 482-1817.

Beach house for sale or rent. West Galveston Island. All electric. Lovely Gulf view. One block to water. Green, 932-3486.

### FOR SALE/AUTOS

66 Olds Delta 88, 4-dr. hardtop, full equipped, new tires, excellent condition, one owner, \$1800. C. C. Kraft, HU 2-7357.

62 Corvair Monza 2-dr. bucket seats, 4-speed, new tires, good second car. Charlie Duke, 877-1389.

66 Simca GLS, 1000, 4-dr., full financing can be arranged. \$775. Consider trade. Floyd Turner, 733-7667.

64 4-dr. Buick Special, factory air, P/S auto, new muffler, shocks, brakes, good rubber, 55,000 mi., E. Simon, 488-4043.

64 4-dr. Olds F-85, factory air 3-sp, new muffler, shocks, brakes, good rubber, 38,000 mi., runs perfect. E. Simon, 488-4043.

64 Corvair Monza 2-dr., bucket seats, auto transmission, good running condition, \$250. For quick sale. Carpenter, 877-4810.

64 Pontiac Catalina, 2-dr. hardtop, air and power, good condition, very reasonable. Jerry Franklin, 932-6057, after 5.

66 Mustang, V-8, air, automatic, 29,000 miles, new tires, excellent condition. Dunn, GR 9-1295 after 5.

62 VW, original owner, \$545. M. G. Kingsley, 946-5109 after 6.

66 Pontiac GTO, 2-dr. hardtop 389 V-8, 4-speed, air, red with white interior, excellent condition. Paul Joyce, 932-5165 League City.

64 Ford Galaxie 500 2/dr., hardtop, standard, Thunderbird 390 motor, excellent paint, tires, good mech condition, \$750. Fleming, 921-0553.

63 Galaxie 500 — factory air, power steering, new tires, brakes, 2-door, auto

trans., radio, 1-A condition. Hodge, 946-8695 after 5.

66 Ford Custom 500 4-dr V8, air pwr steering and brakes, good condition, \$1144. Hanisch, 926-8994.

65 Plymouth Fury III, 2-dr hardtop, 42,000 miles, air, power, auto transmission, excellent condition, \$1195. Paul Coan, 488-1028.

65 MGB—will sell motor, new transmission, etc, or I will buy intact front end, (hood, fenders, radiator). Cox, 944-6077.

65 VW, air, new tires, very good condition. Butler, 482-7567.

64 Falcon Ranchero 2-dr 6-cyl, xlnt cond, \$450. Kuznetz, 591-3779.

1961 Renault Dauphine, \$125 or best offer. Dan Fard, 944-2037.

1965 V.W., \$900. W. B. McCown, 488-1559.

### FOR SALE/MISCELLANEOUS

Will fly persons anywhere they want, on weekends, for cost. Blankenship, 944-0750 after 5.

1965 Allstate Mo-Ped, motor in good shape, \$50. Dana Murphy, 479-1942.

Fly with no-profit Skyrovers, Inc. at La-Porte. Student pilots welcome. 172—\$6/hr, 182—\$8/hr, J3—\$4.50/hr., \$12.50/mo. dues. 488-3872 or 944-5635.

Tektronix oscilloscope, excellent condition; also other test equipment items. R. B. Lang, 488-0149 evenings.

Penn reel with line \$35. Gulton rechargeable lantern \$7.50; two-piece, 10-ft. surf spin rod \$12.50. Bob Sherman, HU 2-7949 after 4.

Modern Kroehler living room suite recently upholstered, brown sofa and orange chair, \$150, 488-0125.

Lone Star 16 sailboat, trailer, many extras, all in excellent condition. E. Simon, 488-4043.

17' Regal Lancer outboard cabin cruiser, 1964 60-hp Johnson O/B, Wards tilt trailer, extras, \$950. Gene Krause, 932-3420.

Learn to fly with Aero Club. Cessna 150 \$7/hr wet; C-172 \$9/hr and K-Bonanza \$16/hr. Instructor \$5/hr. Ward, 877-3187.

Coffee table 56"x19", 2 steptype lamp tables, solid pecan, walnut, excellent, \$25. Dunaway, PR 4-2367.

Large 3-piece modern sectional sofa with 3 built-in tables, \$125. Selling for smaller one. Bud Durand, 932-5777.

Complete MGA shop manual, \$8. Roy Parker, 591-2253.

Toy Poodles, AKC—champion and show lines, 4 months, white male and female. Lunney, 482-7869.

Used manual typewriter and metal stand. Royal, elite type, 18-inch carriage, rebuilt condition, \$25. Wagoner, 782-2627.

Ladies diamond ring approx. 35 points. Cost \$315, sell \$125. Wagoner, 782-2627.

19 foot fiberglass keel sloop, dacron sails, aluminum mast, trailer, extras, \$995. Marvin Williams, 474-3954.

Roberts Model 770 4-track stereo recorder

w/2 mikes and input-output patch cords, good condition. E. B. Walters, MI 9-2838.

Albatross, fiberglass, 15 ft., 64-in. beam, centerboard, main and jib sails 125 sq. ft., galvanized trailer, \$1,150. Maloney, HU 2-7688.

Will fly up to three persons at cost to log time, share cost 8 to 10 cents/mile. M. von Ehrenfried, 591-4163.

67 marine camper, 12-ft fiberglass boat on top, sleeps four, large tent top w/insect net, zipper flaps. Cost \$995, sell \$695. Hamilton, GR 1-0710 after 5.

67 5-hp Evinrude, 6-gal. tank, used 10 times, winter lay-ups per factory. Cost \$245, sell \$175. L. R. Hamilton, GR 1-0710 after 5.

4-hp Sears rototiller w/tines, rake, plow, etc., winter lay-ups per factory, exclt condition. Cost \$160, sell \$105. Hamilton, GR 1-0710 after 5.

GE Super Trimline 400 portable stereo; one year old, \$50. John Hirasaki, 591-2297.

Black and white TV, 21-inch screen. In good working condition, \$30. Marion Bailey, 944-5658 after 5.

York air compressor and clutch assembly for automobile system. W. Brenton, 488-4372.

14' Enterprise class sailboat, imported from England, dacron sails and trailer. C. K. LaPinta, 591-4795.

68 blue honda CL-90, excellent condition, \$250. B. Reina, 488-1326.

Pine chest, antique hand-rubbed, white glass knobs. 32x29x16 1/2, five drawers. New England clambucket, foot stool. Paul Sturtevant, 591-3905 after 5.

Jacobson 21" self-propelled reel lawnmower. Cost \$164.95 plus \$20 catcher, used one summer, \$100. J. Cohen, HU 8-3171.

Plush nylon bedroom carpet. 10'x10'4" plus heavy separate pad, excellent condition, \$40. J. Cohen, HU 8-3171.

Dalmation puppies, ready late April, four male, five female. AKC registered. Ch. sire, Int. Ch. Lineage. Granger, GR 1-3405.

Getzen Bb bass clarinet w/case, xlnt, \$150. Kent snare drum w/two sets drumsticks, \$10. Linda Bennett, MI 9-3576 after 5.

Set nine children's books incl Swiss Family Robinson, Black Beauty, Treasure Island, \$2.50 Latin and English word sets, \$1 each. Linda Bennett, MI 9-3576 after 5.

A-100 Suzuki, 1500 miles. \$250. Bill Campbell, 488-3635.

Electric garage door opener, Crane, new still in package, good for 16-ft. door. \$90. T. Redding, 932-2077.

16" GE portable B&W TV, old but works good, \$30 repaired a year ago, \$15. Stan Avent, 877-1162.

Walnut Magnavox TV stereo combination-AM-FM, good condition, best offer. Bilodeau, HU 2-7990.

10 x 14 ft. Sears dry-wall tent, outside frame, sewn-in-floor, side room and carrying bags for tent and poles. \$65. Randall, 932-3884.

Two-burner Coleman camp stove, excellent condition—\$8. Randall, 932-3884.

14-ft. extra wide aluminum jon boat in excellent condition, boat trailer with 15-inch wheels complete with running lights. Bath for \$155. Randall, 932-3884.

Emdeko Super-8 movie camera, electronic lightmeter f1.8 zoom lens, built-in filter pistol grip w/carrying case and sun gun, \$125 all. Chassay, 946-2216.

Emdeko movie projector, for super 8 or regular film, automatic threading, \$100. Chassay, 946-2216.

Early-American orange-brown tweed chair and one-half matching ottoman, good condition, \$75. Jim McBarron, 591-3778.

Early-American wingback four-cushing length couch, sound condition, needs to be reupholstered, \$75. Jim McBarron, 591-3778.

Early-American Sprague & Carlton hard rock maple coffee and two matching end tables, all three pieces for \$75. Jim McBarron, 591-3778.

Windshield for Honda-90 motorcycle with mounting brackets. Excellent condition, \$10. J. Shone, 488-0157.

Japanese Pugs—pups or grow your own. Three puppies (\$75 each) or one mother (\$50). Clint Burton, WA 3-8228.

### WANTED

Want to buy Lionel electric trains made before 1960. 932-4174 after 5.

Need 4-bedrm home mid June, NASA area, owners only. Send particulars to Apt. 45, No. 1 Portofino Strip, Houston. C. N. Rice, 483-2901.

Need 4-burner gas range in good condition and reasonably priced. Jim Bodmer, 932-4841.

26" or 28", 3 speed, racer bicycle in good condition, will pay \$15-\$25. G. Grisaffe, 591-2118.

Wish to join or start carpool from Pearland area. Hours 8:00 to 4:30. Butler, 4281.

Ping pong table. Ted Guillory, 472-8208.

Kingside bed, no frame. Also, sectional or straight sofa, console stereo, dining chairs—all Spanish. Bob Allgeier, 591-4627.

## Country Theater Opens 'Crucible' Friday Night

The Clear Creek Country Theater in League City Friday will raise the curtain on its production of Arthur Miller's play, "The Crucible" at 8 pm with performances each Friday, Saturday and Sunday through April 20.

Drawing its material from New England witchcraft trials in the late 1600s, "The Crucible" is directed by Jo Simmons, wife of Bill Simmons of Propulsion and Power Division. Production manager is Joan Aldrin, wife of Apollo XI lunar module pilot Edwin E. Aldrin.

"Crucible" cast members include special assistant to the Director of Science and Applications Paul Penrod as Willard, Victor Bond of Mission Planning and Analysis Division as Cheever, and Primrose Fitzgerald, wife of John Fitzgerald of Reliability and Quality Assurance Office, as Anne Putnam.

Paintings by Richard Wood, 16-year-old son of Jakey Wood of Procurement Division, will be on display in the theater lobby during the production. Young Wood is studying with the local artist Jan (The Dutchman) Maters and his paintings have won a number of art show awards.

The Clear Creek County Theater box office will be open daily April 7 to 20 from noon to 5:30 pm, or telephone reservations may be made at 932-3714. The Theater is on Hwy 3 one block south of Main Street in League City.

**U.S. SAVINGS BONDS  
NEW FREEDOM SHARES**

**Buy U.S.  
Savings Bonds**

### Aero Club Starts New Ground Class

The Aero Club Thursday will hold the first session of a new private ground school using the Sanderson audio-visual course. Classes meet at 5:15 pm in Room 517 Bldg 2.

Partly subsidized by the MSC Employee Activities Association, the ground school tuition is \$20. To register, attend the first class or call Bob Monesko at 2457.

### Optimists Form MSC-Area Club

A Clear Lake area Optimist Club is in the formative stages, and it is anticipated that the new club will meet Wednesday or Thursday evenings from 6:45 to 8 pm. The new group has just begun formal organization and still has to choose a club name and civic improvement projects and write bylaws.

Optimists clubs, aimed toward "constructive civic achievement through fellowship, friendship and harmonious cooperation," keep business to a minimum at weekly meetings to allow more time for speakers and timely programs.

For additional information on the new club, call W. G. Pratt at 2201 or 932-2600, or Tom Hiser at HU 8-1270 Ext 430 or 932-3669.

### Get Group Achievement Award



**HAZARD HUNTERS**—Six members of the MSC White Sands Test Facility Apollo Flammability and Materials Test Team recently received a Group Achievement Award for "outstanding engineering and managerial accomplishment in developing new test techniques and new materials, and in conducting the significant tests which verified the spacecraft interior configuration and atmosphere for minimizing the fire hazard in manned spacecraft. The exceptional support of this team was a key factor in the outstanding success of the Apollo VII Program." Team members left to right are R. B. Munson, I. D. Smith, K. B. Gilbreath, L. A. Schluter, D. L. Phippen and R. B. Tillett.

## Tops in Basketball League



**TROPHY TAKES**—With 21 wins and one loss, The Association nailed down first place in the EAA Basketball League. Left to right are Tom Keeton, Lee Norbraten, Gid Weber, Phil Shannahan, team captain Ken Young, Larry Ratcliff, Gene Ricks, Richard Kruse, Al Morrey and Jerry Shinkle. Not in photo: Ham Erne.

## Astronomers' Spectral Analyses Confirm Water Present on Mars

Astronomers at the McDonald Observatory of the University of Texas have obtained the first conclusive proof of the existence of water on Mars.

An observing team including Dr. Ronald Schorn, of the NASA Jet Propulsion Laboratory, Pasadena, Calif., and Stephen Little, of the University of Texas Astronomy Department, Austin, obtained several spectra of Mars in the critical wave-length region which were greatly superior to any previously available.

The spectra were analyzed by Schorn, Little and Dr. C. B. Farmer, a planetary scientist also of JPL. These spectra give unambiguous proof of the existence, amount and uneven distribution between hemispheres of water-vapor in the atmosphere of Mars.

The amount of water vapor measured was equivalent to a film of liquid water about two thousandths of an inch thick in the southern Martian hemisphere and about half that in the northern. This corresponds to a little more than one cubic mile of water evaporated into the Martian atmosphere.

At this season on Mars the north polar cap has almost completely disappeared, and the south polar cap is now forming. Many astronomers believe that the polar caps are mostly frozen carbon dioxide (dry ice). These new observations show that an appreciable amount of water ice must also be present.

The observed amount of water vapor, if deposited as frost or snow, would form a layer some millimeters thick over the poles, and would look quite white and opaque as seen from Earth. The observations are also consistent with the "white clouds" often seen on Mars being formed of ice crystals like ordinary cirrus clouds on Earth.

These new spectra were made possible by NASA-supported

improvements in the McDonald 82-inch Struve reflecting telescope and its large spectrograph. Observations of Mars are also just beginning this month with the even more powerful, new 107-inch reflecting telescope at McDonald Observatory, built through funding by NASA, NSP and the University of Texas at Austin.

Use of these instruments, together with an unusually favorable placing of Mars in its orbit, on several very dry days at the Observatory, made the new observations possible. In particular, it is necessary for Mars to be moving rapidly toward or away from Earth.

Such motion shifts the apparent position of the Martian water-vapor spectral absorptions far enough away from their much stronger terrestrial counterparts so that they can be observed. The comparison is important because, at the time the observations were made, there was more than 20 times as much water in the Earth's atmo-

sphere above this desert mountaintop Observatory as in the atmosphere of Mars.

Although there have been previous reports of the detection of water on Mars, the spectroscopic data were not taken under as ideal conditions. These new plates show the unmistakable presence of water vapor on Mars.

The Mariner space probes now on their way to Mars are primarily designed to send back extremely detailed photographs of the Martian surface. However, they also offer the possibility of mapping in more detail the distribution of water vapor over the surface of the planet, during the Martian fly-by.

Ground-based observations of Mars with the giant McDonald telescopes will continue for years and will make it possible to study seasonal changes in the amount and distribution of water and other Martian atmospheric constituents. A Martian year, with its four seasons, much like those on Earth, lasts for 1.8 Earth years.

## 10-YEAR LIFETIME—

# Large Space Station Proposed by Mueller

A large US space station could be built 200 to 300 miles above the Earth by assembling prefabricated modules launched separately into orbit.

The concept for the mid-1970s was described to a Congressional committee recently by Dr. George E. Mueller, NASA Associate Administrator for Manned Space Flight.

Types of modules now under consideration include:

Crew quarters for sleeping, cleanliness, personal hygiene, and human waste disposal;

Ward room for dining and food preparation plus facilities for crew off-duty activities;

Systems module to house the power distribution, environmental control, and life support systems;

Docking and cargo handling module, which would permit docking of resupply vehicles; crew interchange; unloading of food, materials, supplies, and expendables; and loading of equipment, materials, film, and other data for return to Earth;

Laboratory modules with equipment installed on the ground for conducting specific laboratory experiments in such fields as astronomy, space physics, manufacturing, or other scientific and engineering disciplines;

Maintenance module consisting of machine shops and other facilities for the calibration, adjustment, and updating of equipment; and

Storage module to serve as a warehouse for food, spare parts, and expendables.

Through selection, design and arrangement of the various types of modules, the initial space station could be expanded for crew size, additional laboratory facilities, or other special purpose equipment. It could provide, for example, either "Zero g" or arti-

ficial gravity modes for certain experiments.

The space complex is planned for 10 years of continuous operation. This would be achieved by high reliability sub-systems design plus provisions for maintenance, repair, refurbishment, replacement of parts, and replacement of expendables.

The crew would be rotated at three to six-month intervals and new experiment packages and modules brought up as they became available and could be accommodated by the station work-load.

The station would be initially sized for a crew of 12 and 10,000 cubic feet of useable space. Electric power would come from solar panels or a small nuclear generator.

Men and materials would be ferried between the station and Earth by reusable shuttles that would be launched vertically, shed their fuel tanks in flight, and land horizontally at airports.

## Navigation Group Meets at MSC

The Institute of Navigation April 22-24 will meet at MSC on "Space Navigation—Present and Future." The three-day session will include seven MSC speakers.

MSC Director Robert R. Gilruth will make a welcoming address at the April 23 morning session in the MSC Auditorium, and NASA Deputy Associate Administrator for Manned Space Flight Charles W. Mathews (formerly Gemini Program manager at MSC) will be the luncheon speaker in the MSC Cafeteria.

The afternoon session will include a paper "Apollo Optics—Field and Flight Tests," by Enoch M. Jones and Charles E. Manry of Guidance and Control Division. Speaker for the 7 pm banquet at the Holiday Inn will be Massachusetts Institute of Technology Instrumentation Laboratory director Dr. C. Stark Draper.

The April 24 morning session will include two papers by MSC employees: "Guidance and Control Considerations for Advanced Space Missions," by Assistant Director for Electronic Systems Robert A. Gardiner and George Xenakis of Guidance and Control Division, and "Switching Logic and Steering Equations for Multiple-Burn Earth Escape Maneuvers," by Jack Funk and Stewart F. McAdoo of Mission Planning and Analysis Division.

Registration for the ION meeting will be from 6 to 10 pm April 22 at the Holiday Inn. Advance registration forms can be got from David Dyas, Suite 203, 1730 NASA Blvd., Houston 77058.

## Their Other Hats



**RESERVISTS**—Dr. Robert Seamans, Secretary of the Air Force and former Deputy NASA Administrator, March 21 presented MSC Director Robert R. Gilruth the Secretary's Award for Support of Reserve Forces at the Air Force Association Convention in Houston. The award was in recognition of MSC management's support of Air Force Reservists who are employees at the Center. Left to right are Seamans, Maj. D. T. Riley, Administration Directorate, Maj. W. Calhoun, Flight Crew Operations Division, Maj. F. J. Herbert, Flight Operations Directorate, Maj. R. J. Wieland, Legal Office, Maj. L. J. Sullivan, Flight Operations Directorate, Maj. A. A. Verrengia, Apollo Applications Program Office, and Gilruth.